

acm Transactions on Mathematical Software

Volume 16 • 1990

Editor-in-Chief

John R. Rice

Algorithms Editor

Robert J. Renka

Associate Editors

Paul Boggs

Ronald F. Boisvert

Bob F. Caviness

Tony F. Chan

W. M. Coughran, Jr.

Jack Dongarra

W. Enright

L. D. Fosdick

Fred N. Fritsch

Richard J. Hanson

Daniel S. Hirschberg

Roy E. Marsten

John Reid

Michael A. Saunders

Hans J. Stetter

Ronald Thisted

Paul Wang

Published by the Association for Computing Machinery

Copyright 1990 Association for Computing Machinery
11 West 42 Street, New York, NY 10036

- 293 **ACM Algorithms Policy.** Krogh F. T. Vol. 16, No. 3 (Sept. 1990), 293–296.
297 **Information for Authors.** Vol. 16, No. 3 (Sept. 1990), 297–299.
404 **Remark on Algorithm 644.** Amos, D. E. Vol. 16, No. 4 (Dec. 1990), 404.
109 **Remark on Algorithm 657.** Vol. 16, No. 1 (Mar. 1990), 109.
401 **Remark on Algorithm 620.** Hopkins, T., and Morse, D. Vol. 16, No. 4 (Dec. 1990), 401–403.
405 **Remark on Algorithm 662.** Garbow, B. S. and Lyness, J. N. Vol. 16, No. 4 (Dec. 1990), 405–406.

Contributed Papers

- 169 **Amos, D. E.** Computation of Exponential Integrals of a Complex Argument. Vol. 16, No. 2 (June 1990), 169–177.
48 **Arney, D. C. and Flaherty, J. E.** An Adaptive Mesh-Moving and Local Refinement Method for Time-Dependent Partial Differential Equations. Vol. 16, No. 1 (Mar. 1990), 48–71.
201 **Cash, J. R. and Karp, A. H.** Variable Order Runge–Kutta Method for Initial Value Problems with Rapidly Varying Right-Hand Sides. Vol. 16, No. 3 (Sept. 1990), 201–222.
29 **Cody, W. J.** Performance Evaluation of Programs for the Error and Complementary Error Functions. Vol. 16, No. 1 (Mar. 1990), 29–37.
1 **Dongarra, J. J., Du Croz, J., Hammarling, S., and Duff, I.** A Set of Level 3 Basic Linear Algebra Subprograms. Vol. 16, No. 1 (Mar. 1990), 1–17.
1 **Du Croz, J.** See Dongarra, J. J. Vol. 16, No. 1 (Mar. 1990), 1–17.
1 **Duff, I.** See Dongarra, J. J. Vol. 16, No. 1 (Mar. 1990), 1–17.
303 **Fan, C.-J.** See Pothen, A. Vol. 16, No. 4 (Dec. 1990), 303–324.
48 **Flaherty, J. E.** See Arney, D. C. Vol. 16, No. 1 (Mar. 1990), 48–71.
1 **Hammarling, S.** See Dongarra, J. J. Vol. 16, No. 1 (Mar. 1990), 1–17.
86 **Hansen, E. R., Patrick, M. L., and Wang, R. L. C.** Polynomial Evaluation with Scaling. Vol. 16, No. 1 (Mar. 1990), 86–93.
352 **Higham, N. J.** Exploiting Fast Matrix Multiplication Within the Level 3 BLAS. Vol. 16, No. 4 (Dec. 1990), 352–368.

- 201 Karp, A. H. See Cash, J. R. Vol. 16, No. 3 (Sept. 1990), 201-222.
- 143 Meintjes, K., and Morgan, A. P. Chemical Equilibrium Systems as Numerical Test Problems. Vol. 16, No. 2 (June 1990), 143-151.
- 143 Morgan, A. P. See Meintjes, K. Vol. 16, No. 2 (June 1990), 143-151.
- 269 Nair, A. An Improved Algorithm for Ordered Sequential Random Sampling. Vol. 16, No. 3 (Sept. 1990), 269-274.
- 275 Palacios-Velez, O., and Renaud, B. C. A Dynamic Hierarchical Subdivision Algorithm for Computing Delaunay Triangulations and Other Closest-Point Problems. Vol. 16, No. 3 (Sept. 1990), 275-292.
- 86 Patrick, M. L. See Hansen, E. R. Vol. 16, No. 1 (Mar. 1990), 86-93.
- 38 Poppe, G. P. M., and Wijers, C. M. J. More Efficient Computation of the Complex Error Function. Vol. 16, No. 1 (Mar. 1990), 38-46.
- 303 Pothén, A., and Fan, C.-J. Computing the Block Triangular Form of a Sparse Matrix. Vol. 16, No. 4 (Dec. 1990), 303-324.
- 246 Preusser, A. Efficient Formulation of A Bivariate Nonic C^2 -Hermite Polynomial on Triangles. Vol. 16, No. 3 (Sept. 1990), 246-252.
- 275 Renaud, B. C. See Palacios-Velez, O. Vol. 16, No. 3 (Sept. 1990), 275-292.
- 72 Schryer, N. L. Designing Software for One-Dimensional Partial Differential Equations. Vol. 16, No. 1 (Mar. 1990), 72-85.
- 258 Shacham, M. See Shacham, O. Vol. 16, No. 3 (Sept. 1990), 258-268.
- 258 Shacham, O., and Shacham, M. Finding Boundaries of the Domain of Definition for Functions Along a One-Dimensional Ray. Vol. 16, No. 3 (Sept. 1990), 258-268.
- 223 Smith, J. E. See Weiss, S. Vol. 16, No. 3 (Sept. 1990), 223-245.
- 94 Snow, D. M. Weyl Group Orbits. Vol. 16, No. 1 (Mar. 1990), 94-108.
- 185 Tang, P. T. P. Accurate and Efficient Testing of the Exponential and Logarithm Functions. Vol. 16, No. 3 (Sept. 1990), 185-201.
- 378 Tang, P. T. P. Table-Driven Implementation of the Logarithm Function in IEEE Floating-Point Arithmetic. Vol. 16, No. 4 (Dec. 1990), 378-400.
- 86 Wang, R. L. C. See Hansen, E. R. Vol. 16, No. 1 (Mar. 1990), 86-93.
- 223 Weiss, S., and Smith, J. E. A Study of Scalar Compilation Techniques for Pipelined Supercomputers. Vol. 16, No. 3 (Sept. 1990), 223-245.
- 38 Wijers, C. M. J. See Poppe, G. P. M. Vol. 16, No. 1 (Mar. 1990), 38-46.
- 113 Zenios, S. A. Integrating Network Optimization Capabilities into a High-Level Modeling Language. Vol. 16, No. 2 (June 1990), 113-142.

Algorithms

- 178 Amos, D. E. Algorithm 683: A Portable FORTRAN Subroutine for Exponential Integrals of a Complex Argument. Vol. 16, No. 2 (June 1990), 178-182.
- 18 Dongarra, J. J., Du Croz, J. Hammarling, S., and Duff, I. Algorithm 679: A Set of Level 3 Basic Linear Algebra Subprograms. Vol. 16, No. 1 (Mar. 1990), 18-28.
- 18 Du Croz, J. See Dongarra, J. J. Vol. 16, No. 1 (Mar. 1990), 18-28.
- 18 Duff, I. See Dongarra, J. J. Vol. 16, No. 1 (Mar. 1990), 18-28.
- 369 Gragg, W. B. See Reichel, L. Vol. 16, No. 4 (Dec. 1990), 369-377.
- 18 Hammarling, S. See Dongarra, J. J. Vol. 16, No. 1 (Mar. 1990), 18-28.
- 325 Kaufman, L., and Warner, D. D. Algorithm 685: A Program for Solving Separable Elliptic Equations. Vol. 16, No. 4 (Dec. 1990), 325-351.
- 152 Kearfott, R. B., and Novoa, M., III. Algorithm 681: INTBIS, A Portable Interval Newton/Bisection Package. Vol. 16, No. 2 (June 1990), 152-157.
- 158 Muri, A., and Rizzardi, M. Algorithm 682: Talbot's Method for the Laplace Inversion Problem. Vol. 16, No. 2 (June 1990), 158-168.
- 152 Novoa, M., III. See Kearfott, R. B. Vol. 16, No. 2 (June 1990), 152-157.
- 47 Poppe, G. P. M., and Wijers, C. M. J. Algorithm 680: Evaluation of the Complex Error Function. Vol. 16, No. 1 (Mar. 1990), 47.
- 253 Preusser, A. Algorithm 684: C^1 - and C^2 -Interpolation on Triangles with Quintic and Nonic Bivariate Polynomials. Vol. 16, No. 3 (Sept. 1990), 253-257.
- 369 Reichel, L., and Gragg, W. B. Algorithm 686: FORTRAN Subroutines for Updating the QR Decomposition. Vol. 16, No. 4 (Dec. 1990), 369-377.
- 158 Rizzardi, M. See Muri, A. Vol. 16, No. 2 (June 1990), 158-168.
- 325 Warner, D. D. See Kaufman, L. Vol. 16, No. 4 (Dec. 1990), 325-351.
- 47 Wijers, C. M. J. See Poppe, G. P. M. Vol. 16, No. 1 (Mar. 1990), 47.

Line Count of ACM Algorithms (March 1984–Dec. 1990)

Vol. Issue (Number)	Line Count	Title
10,1 (612)	2944	TRIEX: Integration Over a TRIangle Using Nonlinear Extrapolation
10,1 (613)	223	Minimum Spanning Tree for Moderate Integer Weights
10,2 (614)	1099	A FORTRAN Subroutine for Numerical Integration in H_n
10,2 (615)	1818	The Best Subset of Parameters in Least Absolute Value Regression
10,3 (616)	441	Fast Computation of the Hodges-Lehman Location Estimator
10,3 (617)	4065	DAFNE—A Differential Algorithm for Non-Linear Functions
10,3 (618)	1589	FORTTRAN Subroutine for Estimating Sparse Jacobian Matrices
10,3 (619)	742	Automatic Numerical Inversion of the Laplace Transform
10,4 (620)	3211	References and Keywords for Collected Algorithms from ACM
10,4 (621)	2025	Software with Low Storage Requirements for Two-Dimensional, Nonlinear, Parabolic Differential Equations
10,4 (622)	15,883	A Simple Macroprocessor
10,4 (623)	6496	Interpolation on the Surface of a Sphere
10,4 (624)	5983	Triangulation and Interpolation at Arbitrarily Distributed Points in the Plane
10,4 (625)	4104	A Two-Dimensional Domain Processor
10,4 (626)	1899	TRICP: A Contour Plot Program for Triangular Meshes
11,1 (627)	2199	A FORTRAN Subroutine for Solving Volterra Integral Equations
11,1 (628)	3040	An Algorithm for Constructing Canonical Bases of Polynomial Ideals
11,2 (629)	5261	An Integral Equation Program for Laplace's Equation in Three Dimensions
11,2 (630)	14092	BBVSCG—A Variable-Storage Algorithm for Function Minimization
11,2 (631)	735	Finding a Bracketed Zero by Larkin's Method of Rational Interpolation
11,2 (632)	769	A Program for the 0-1 Multiple Knapsack Problem
11,2 (633)	3532	An Algorithm for Linear Dependency Analysis of Multivariate Data
11,3 (634)	1997	CONST and EVAL: Routines for Fitting Multinomials in a Least-Squares Sense
11,3 (635)	2630	An Algorithm for the Solution of Systems of Complex Linear Equations in the \mathcal{L}_∞ Norm with Constraints on the Unknowns
11,4 (636)	2864	FORTTRAN Subroutines for Estimating Sparse Hessian Matrices
11,4 (637)	10,764	INCOL and HERMCOL: Collocation on Rectangular Domains with Bicubic Hermite Polynomials
11,4 (638)	3825	GENCOL: Collocation on General Domains with Bicubic Hermite Polynomials
12,1 (639)	1647	To Integrate Some Infinite Oscillating Tails
12,1 (640)	1596	Efficient Calculation of Frequency Response Matrices from State Space Models
12,2 (641)	1658	Exact Solution of General Integer Systems of Linear Equations
12,2 (642)	1092	A Fast Procedure for Calculating Minimum Cross-Validation Cubic Smoothing Splines
12,2 (643)	1168	FEXACT: A FORTRAN Subroutine for Fisher's Exact Test on Unordered $r \times c$ Contingency Tables
12,3 (644)	20,148	A Portable Package for Bessel Functions of a Complex Argument and Nonnegative Order
12,3 (645)	1,158	Subroutines for Testing Programs that Compute the Generalized Inverse of a Matrix
12,3 (646)	1,683	PDFIND—A Routine to Find a Positive Definite Linear Combination of Two Real Symmetric Matrices
12,4 (647)	1,062	Implementation and Relative Efficiency of Quasirandom Sequence Generators
13,1 (648)	22,844	NSDTST and STDTST: Routines for Assessing the Performance of Initial Value Solvers
13,1 (649)	7,032	A Package for Computing Trigonometric Fourier Coefficients Based on Lyness's Algorithm
13,2 (650)	427	Efficient Square Root Implementation on the 68000
13,3 (651)	18,078	Algorithm HFFT—A High-Order Fast-Direct Solution of the Helmholtz Equation
13,3 (652)	13,441	HOMPACK: A Suite of Codes for Globally Convergent Homotopy Algorithms
13,3 (653)	4,314	Translation of Algorithm 539: PC-BLAS, Basic Linear Algebra Subprograms for FORTRAN Usage with the INTEL 8087, 80287 Numeric Data Processor
13,3 (654)	1,517	FORTTRAN Subroutines for Computing the Incomplete Gamma Function Ratios and their Inverse
13,4 (655)	3,953	IQPACK: FORTRAN Subroutines for the Weights of Interpolatory Quadratures
14,1 (656)	31,803	An Extended Set of Basic Linear Algebra Subprograms: Model Implementation and Test Programs
14,1 (657)	589	Plotting Contour Surfaces of a Function of Three Variables
14,1 (658)	10,760	ODESSA—An Ordinary Differential Equation Solver with Explicit Simultaneous Sensitivity Analysis
14,1 (659)	1,002	Implementing Sobol's Quasirandom Sequence Generator
14,2 (660)	1,508	QSHEP2D: Quadratic Shepard Method for Bivariate Interpolation of Scattered Data
14,2 (661)	1,638	QSHEP3D: Quadratic Shepard Method for Trivariate Interpolation of Scattered Data
14,2 (662)	4,537	A FORTRAN Software Package for the Numerical Inversion of the Laplace Transform Based on Weeks' Method
14,2 (663)	4,086	Translation of Algorithm 539: Basic Linear Algebra Subprograms for FORTRAN Usage in FORTRAN 200 for the Cyber 205
14,3 (664)	1,536	A Gauss Algorithm to Solve Systems with Large, Banded Matrices Using Random-Access Disk Storage
14,4 (665)	290	MACHAR: A Subroutine to Dynamically Determine Machine Parameters

Line Count of ACM Algorithms (March 1984–Dec. 1990)

Vol. Issue (Number)	Line Count	Title
14,4 (666)	1,386	CHABIS: A Mathematical Software Package for Locating and Evaluating Roots of Systems of Nonlinear Equations
14,4 (667)	6,961	SIGMA: A Stochastic-Integration Global Minimization Algorithm
14,4 (668)	448	H2PEC: Sampling from the Hypergeometric Distribution
15,1 (669)	2,008	BRKF45: A FORTRAN Subroutine for Solving First-Order Systems of Nonstiff Initial Value Problems for Ordinary Differential Equations
15,1 (670)	5,782	A Runge-Kutta-Nyström Code
15,1 (671)	3,296	FARB-E-2D: Fill Area with Bicubics on Rectangles—A Contour Plot Program
15,2 (672)	5,591	Generation of Interpolatory Quadrature Rules of the Highest Degree of Precision with Preassigned Nodes for General Weight Functions
15,2 (673)	387	Dynamic Huffman Coding
15,2 (674)	3,046	FORTRAN Codes for Estimating the One-Norm of a Real or Complex Matrix, with Applications to Condition Estimation
15,3 (675)	7,403	FORTRAN Subroutines for Computing the Square Root Covariance Filter and Square Root Information Filter in Dense or Hessenberg Forms
15,4 (676)	37,893	ODRPACK: Software for Weighted Orthogonal Distance Regression
15,4 (677)	1,915	C ¹ Surface Interpolation
15,4 (678)	288	BTPEC: Sampling from the Binomial Distribution
16,1 (679)	23,067	A Set of Level 3 Basic Linear Algebra Subprograms
16,1 (680)	214	Evaluation of the Complex Error Function
16,2 (681)	11,563	INTBIS, a Portable Interval Newton/Bisection Package
16,2 (682)	3,090	Talbot's Method for the Laplace Inversion Problem
16,2 (683)	4,256	A Portable FORTRAN Subroutine for Exponential Integrals of a Complex Argument
16,3 (684)		C ¹ - and C ² - Interpolation on Triangles with Quintic and Nonic Bivariates
16,4 (685)		A Program for Solving Separable Elliptic Equations
16,4 (686)		FORTRAN Subroutines for Updating the QR Decomposition

